



SEQUENCE LISTING

<110> Ayyavoo, Velpandi
Patel, Mamata
Kieber-Emmons, Thomas
Weiner, David B.
Mahalingam, Sundaramy

<120> Functional Fragments of HIV-1 VPR Protein and Methods of Using the Same

<130> UPAP0350

<140> 09/485,421
<141> 1998-08-14

<150> 60/055,754
<151> 1997-08-14

<160> 18

<170> PatentIn Ver. 2.1

<210> 1
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<212> PRT
<213> Artificial Sequence

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<223> Description of Artificial Sequence: Novel Sequence

<400> 1

Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Tyr Pro Asn
1 5 10 15

Asp Trp Thr Leu Glu Leu Leu Glu Leu Lys Asn Glu Ala Val Arg
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu
50 55 60

Gln Gln Leu Leu Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg
65 70 75 80

Ile Gly Ile Ile Gln Gln Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser
85 90 95

<210> 2

<211> 101

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 2

Met Glu Glu Arg Pro Pro Glu Asn Glu Gly Pro Gln Arg Glu Pro Trp
1 5 10 15

Asp Glu Trp Val Val Glu Val Leu Glu Glu Leu Lys Glu Glu Ala Leu
20 . 25 30

Lys His Phe Asp Pro Arg Leu Leu Thr Ala Leu Gly Asn His Ile Tyr
35 40 45

Asn Arg His Gly Asp Thr Leu Glu Gly Ala Gly Glu Leu Ile Arg Ile
50 55 60

Leu Gln Arg Ala Leu Phe Met His Phe Arg Gly Gly Cys Ile His Ser
65 70 75 80

Arg Ile Gly Gln Pro Gly Gly Asn Pro Leu Ser Ala Ile Pro Pro
85 90 95

Ser Arg Ser Met Leu
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<210> 3

<211> 111

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 3

Met Thr Asn Pro Arg Glu Thr Ile Pro Pro Gly Asn Ser Gly Glu Glu
1 5 10 15

Thr Ile Glu Glu Ala Phe Asp Trp Leu Asp Arg Thr Val Glu Ala Ile

20

25

30

Asn Arg Glu Ala Val Asn His Leu Pro Arg Glu Leu Ile Phe Gln Val
35 40 45

Trp Gln Arg Ser Trp Arg Tyr Trp His Asp Glu Gln Gly Met Ser Arg
50 55 60

Ser Tyr Thr Lys Tyr Arg Tyr Leu Cys Leu Met Gln Lys Ala Val Phe
65 70 75 80

Met His Phe Lys Lys Gly Cys Thr Cys Arg Gly Glu Gly His Gly Pro
85 90 95

Gly Gly Trp Arg Ser Gly Pro Pro Pro Pro Pro Pro Gly Leu
100 105 110

<210> 4

<211> 96

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 4

Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn
1 5 10 15

Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu
50 55 60

Gln Gln Leu Leu Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg
65 70 75 80

Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser
85 90 95

<210> 5

<211> 96

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<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 5

Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn
1 5 10 15

Asp Trp Thr Leu Pro Leu Leu Pro Glu Leu Lys Asn Glu Ala Val Arg
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu
50 55 60

Gln Gln Leu Leu Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg
65 70 75 80

Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser
85 90 95

<210> 6

<211> 96

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Novel Sequence

<400> 6

Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn
1 5 10 15

Asp Trp Thr Ala Glu Ala Ala Glu Glu Ala Lys Asn Glu Ala Val Arg
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu
50 55 60

Gln Gln Leu Leu Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg

65 70 75 80

Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser
85 90 95

<210> 7

<211> 96

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Novel Sequence

<400> 7

Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn
1 5 10 15

Asp Trp Thr Leu Glu Leu Glu Glu Leu Lys Asn Glu Ser Val Arg
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu
50 55 60

Gln Gln Leu Leu Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg
65 70 75 80

Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser
85 90 95

<210> 8

<211> 96

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Novel Sequence

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1 5 10 15

Asp Trp Thr Leu Glu Leu Glu Glu Leu Lys Asn Glu Leu Val Arg
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu
50 55 60

Gln Gln Leu Leu Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg
65 70 75 80

Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser
85 90 95

<210> 9

<211> 96

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Novel Sequence

<400> 9

Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn
1 5 10 15

Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Pro Leu Ile Arg Ile Leu
50 55 60

Gln Gln Leu Leu Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg
65 70 75 80

Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser
85 90 95

<210> 10

<211> 96

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 10
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1 5 10 15

Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ser Leu
50 55 60

Gln Gln Leu Leu Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg
65 70 75 80

Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser
85 90 95

<210> 11
<211> 96
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<220>
<223> Description of Artificial Sequence: Novel Sequence

<400> 11
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1 5 10 15

Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu
50 55 60

Gln Gln Ser Leu Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg
65 70 75 80

Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser
85 90 95

<210> 12
<211> 96
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<223> Description of Artificial Sequence: Novel Sequence

<400> 12
Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn
1 5 10 15

Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu
50 55 60

Gln Gln Leu Ser Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg
65 70 75 80

Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser
85 90 95

<210> 13
<211> 96
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<213> Artificial Sequence

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<223> Description of Artificial Sequence: Novel Sequence

<400> 13
Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn
1 5 10 15

Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu
50 55 60

Gln Gln Leu Leu Phe Ile Cys Phe Arg Ile Gly Cys Arg His Ser Arg
65 70 75 80

Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser
85 90 95

<210> 14

<211> 96

<212> PRT

<213> Artificial Sequence

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<223> Description of Artificial Sequence: Novel Sequence

<400> 14

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1 5 10 15

Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu
50 55 60

Gln Gln Leu Leu Phe Ile Tyr Phe Arg Ile Gly Cys Arg His Ser Arg
65 70 75 80

Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser
85 90 95

<210> 15

<211> 96

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 15

Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn
1 5 10 15

Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg

20

25

30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu
 35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu
 50 55 60

Gln Gln Leu Leu Phe Ile His Phe Arg Ile Ala Cys Arg His Ser Arg
 65 70 75 80

Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser
 85 90 95

<210> 16

<211> 96

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 16

Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn
 1 5 10 15

Asp Trp Thr Leu Glu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg
 20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu
 35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu
 50 55 60

Gln Gln Leu Leu Phe Ile His Phe Arg Ile Gly Ser Arg His Ser Arg
 65 70 75 80

Ile Gly Ile Ile Gln His Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser
 85 90 95

<210> 17

<211> 78

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 17

Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Pro Tyr Asn
1 5 10 15

Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu
35 40 45

Thr Tyr Gly Asp Ile Trp Ile Gly Val Glu Ala Leu Ile Arg Ile Leu
50 55 60

Gln Gln Leu Leu Phe Ile His Phe Gln Asn Trp Val Ser Thr
65 70 75

<210> 18

<211> 96

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Novel Sequence

<400> 18

Met Glu Gln Ala Pro Glu Asp Gln Gly Pro Gln Arg Glu Tyr Pro Asn
1 5 10 15

Asp Trp Thr Leu Glu Leu Leu Glu Glu Leu Lys Asn Glu Ala Val Arg
20 25 30

His Phe Pro Arg Ile Trp Leu His Ser Leu Gly Gln His Ile Tyr Glu
35 40 45

Thr Tyr Gly Asp Thr Trp Thr Gly Val Glu Ala Leu Ile Arg Ile Leu
50 55 60

A)
Cont
Gln Gln Leu Leu Phe Ile His Phe Arg Ile Gly Cys Arg His Ser Arg
65 70 75 80

Ile Gly Ile Ile Gln Gln Arg Arg Thr Arg Asn Gly Ala Ser Lys Ser
85 90 95